

## CLAIMS

What is claimed is.

- 1    1.    A process comprising:  
2            mating a microelectronic die substrate to a board, wherein the substrate  
3            includes an upper surface, a lower surface, and a solder first bump disposed on the  
4            lower surface; and while mating  
5            forming a stress-compensation collar (SCC) on the board, wherein the SCC  
6            abuts the solder first bump.
- 1    2.    The process of claim 1, wherein forming the SCC includes embedding the  
2            solder first bump into the SCC to a depth range from about 5 percent embedded to  
3            about 95 percent embedded.
- 1    3.    The process of claim 1, further including reflowing the solder first bump.
- 1    4.    The process of claim 1, further including:  
2            reflowing the solder first bump; and  
3            curing the SCC.
- 1    5.    The process of claim 1, wherein forming an SCC includes dispensing an  
2            SCC mass on the board.
- 1    6.    The process of claim 1, wherein forming an SCC includes dispensing an  
2            SCC mass on the board, wherein the SCC mass includes a plurality of spaced-apart  
3            spots.
- 1    7.    The process of claim 1, wherein mating includes mating through an uncured  
2            organic composition that includes a non-fugitive element in the composition, and

3 wherein the composition includes at least one material selected from an epoxy  
4 solder paste, an epoxy flux, and combinations thereof.

1 8. The process of claim 1, wherein mating includes mating through an uncured  
2 organic composition that includes a non-fugitive element in the composition, and  
3 wherein the composition includes at least one material selected from a resin-  
4 containing flux, a cyanate ester-containing flux, a polyimide-containing flux, a  
5 polybenzoxazole-containing flux, a polybenzimidazole-containing flux, a  
6 polybenzothiazole-containing flux, a polymer-solder-flux paste, and combinations  
7 thereof.

1 9. The process of claim 1, wherein mating includes mating through an uncured  
2 organic composition that includes a non-fugitive element in the composition, and  
3 wherein the composition includes at least one material selected from a paste, a  
4 solder paste, an epoxy-containing solder paste, a resin-containing paste, a cyanate  
5 ester-containing paste, a polyimide-containing paste, a polybenzoxazole-containing  
6 paste, a polybenzimidazole-containing paste, a polybenzothiazole-containing paste,  
7 a flux, and combinations thereof.

1 10. The process of claim 1, wherein forming an SCC includes dispensing a  
2 single SCC mass on the board.

1 11. The process of claim 1, before mating, the process including:  
2 forming a stress-relief layer (SRL) upon the substrate lower surface, wherein  
3 the SRL partially embeds the solder first bump.

1 12. The process of claim 1, further including:  
2 forming an SRL upon the substrate lower surface, wherein the SRL partially  
3 embeds the solder first bump; and  
4 reflowing the solder first bump.

1 13. The process of claim 1, further including:  
2 forming an SRL upon the substrate lower surface, wherein the SRL partially  
3 embeds the solder first bump;  
4 reflowing the solder first bump; and  
5 curing at least one of the SCC and the SRL.

1 14. The process of claim 1, further including:  
2 forming an SRL upon the substrate lower surface, wherein the SRL partially  
3 embeds the solder first bump, and wherein forming includes dispensing the SRL by  
4 ejecting a discrete series of quanta of polymer masses upon the lower surface that  
5 includes a ball grid array in excess of four solder bumps including the solder first  
6 bump.

1 15. An article comprising:  
2 a mounting substrate including a lower surface and an upper surface;  
3 a solder first bump disposed on the lower surface;  
4 and a stress-compensation collar (SCC) disposed on a board, wherein the  
5 SCC partially embeds the solder first bump.

1 16. The article of claim 15, further including a stress-relief layer (SRL) disposed  
2 on the lower surface, wherein the solder first bump is at least partially embedded in  
3 the SRL.

1 17. The article of claim 15, further including a die disposed upon the upper  
2 surface that is coupled to the solder first bump.

1 18. The article of claim 15, further including:  
2 a stress-relief layer (SRL) disposed on the lower surface, wherein the solder  
3 first bump is at least partially embedded in the SRL; and

4 a die disposed upon the upper surface that is coupled to the solder first  
5 bump.

1 19. The article of claim 15, wherein the SCC includes an organic material.

1 20. The article of claim 15, wherein the SCC includes a composition that  
2 includes a non-fugitive element in the composition, and wherein the composition  
3 includes at least one material selected from an epoxy solder paste, an epoxy flux,  
4 and combinations thereof.

1 21. The article of claim 15, wherein the SCC includes a composition that  
2 includes a non-fugitive element in the composition, and wherein the composition  
3 includes at least one material selected from a resin-containing flux, a cyanate ester-  
4 containing flux, a polyimide-containing flux, a polybenzoxazole-containing flux, a  
5 polybenzimidazole-containing flux, a polybenzothiazole-containing flux, a polymer-  
6 solder-flux paste, and combinations thereof.

1 22. The article of claim 15, wherein the SCC includes a composition that  
2 includes a non-fugitive element in the composition, and wherein the composition  
3 includes at least one material selected from a paste, a solder paste, an epoxy-  
4 containing solder paste, a resin-containing paste, a cyanate ester-containing paste, a  
5 polyimide-containing paste, a polybenzoxazole-containing paste, a  
6 polybenzimidazole-containing paste, a polybenzothiazole-containing paste, a flux,  
7 and combinations thereof.

1 23. The article of claim 15, wherein the SCC includes a substantially continuous  
2 sheet that embeds a plurality of solder bumps including the solder first bump.

1 24. The article of claim 15, wherein the solder first bump is in a rectangular  
2 pattern with a solder second bump, a solder third bump, and a solder fourth bump,

3 and wherein the SCC includes a first SCC that abuts the solder first bump, a second  
4 SCC that abuts the solder second bump, a third SCC that abuts the solder third  
5 bump, and a fourth SCC that abuts the solder fourth bump.

1 25. The article of claim 15, wherein the SRL includes a particulate filler.

1 26. A computing system comprising:  
2 a board including a bottom and a land side;  
3 a substrate including a lower surface and an upper surface, wherein the  
4 board is disposed on the substrate land side;  
5 a solder first bump disposed on the lower surface;  
6 a stress-compensation collar (SCC) disposed on the board, wherein the  
7 solder first bump is at least partially embedded in the SCC;  
8 a die disposed upon the upper surface, wherein the die is coupled to the  
9 solder first bump;  
10 at least one of an input device and an output device coupled to the solder  
11 first bump; and  
12 a housing enclosing the SCC.

1 27. The computing system of claim 26, further including a stress-relief layer  
2 (SRL) disposed on the lower surface, wherein the solder first bump is at least  
3 partially embedded in the SRL, and wherein at least a portion of the solder first  
4 bump is exposed above the SRL.

1 28. The computing system of claim 26, wherein the computing system is  
2 disposed in one of a computer, a wireless communicator, a hand-held device, an  
3 automobile, a locomotive, an aircraft, a watercraft, and a spacecraft.

1    29.    The computing system of claim 26, wherein the die is selected from a data  
2    storage device, a digital signal processor, a micro controller, an application specific  
3    integrated circuit, and a microprocessor.